

### REMARKS

Claims 7, 14, 15 and 17 are now pending, with claims 7 and 17 being independent. Claims 8-10, 13, 16 and 18-25 have been withdrawn by the Office. Claims 11 and 12 have been withdrawn by the Applicants for depending from withdrawn claim 10. Claims 7, 14 and 17 have been amended. No new matter has been added. Reconsideration and allowance of the above-referenced application are respectfully requested.

Support for the amendments of claims 7, 8 and 17 can be found, for example, in the Specification from page 8, line 48 to page 9, line 39; from page 11, line 39 to page 12, line 19; and in Figures 1, 3, 10-12 and 26. Claim 14 has been amended to address an antecedence issue. No new matter has been added.

### **Rejections Under 35 U.S.C. § 102**

Claims 7, 14, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,252,933 issued to Kamino et al. (hereinafter “Kamino”), which describes a circuit breaker including a forced contact parting mechanism capable of self-retaining under short circuit condition. The claims have been amended to obviate the rejections.

Claim 1 has been amended to recite an “electrical switch for connecting and breaking a circuit, comprising: a connecting and breaking mechanism to connect and break the circuit provided with at least a set of movable contacts and stationary contacts; an electromagnetism drive mechanism to control the movable and stationary contacts to be actuated so as to close the circuit; a housing to accommodate the movable contacts and stationary contacts; an arc-extinguishing mechanism disposed in the housing and corresponded to the movable and stationary contacts; a case connected to a base to accommodate the electromagnetism drive mechanism; a bedplate associated with the case; a movable bolt connected with the movable contacts; a movable iron core connected with the movable bolt to allow the movable bolt to move based on a movement of the movable iron core; and an electromagnetic holding mechanism disposed on the bedplate to hold the movable and stationary contacts to connect the

circuit after the movable and stationary contacts are connected, wherein *the holding mechanism has an electromagnetic iron, and one of a pothook or a baffle*, wherein when the electromagnetic drive mechanism is powered on, the movable iron core is attracted so that the movable bolt is configured to be driven by the movable iron to move to a position, where *the pothook to hitch the movable bolt or the baffle to ram the movable bolt*, and the movable contacts move to contact with the stationary contacts, and then the electromagnetic iron of the holding mechanism is powered on to cause the pothook or the baffle to be attracted by the electromagnetic iron to further keep the movable and stationary contacts closed.” (Emphasis added.)

Kamino fails to disclose or suggest each and every feature of claims 7 and 17. Kamino discloses:

(i) “The main contacts 5 include: a pair of fixed contacts 10, 10; a moving contact member 9 of bridging type having moving contacts 8, 8 each in a position in contact with each of the fixed contacts 10, 10; a contact spring 11 supporting the moving contact member 9 from the bottom and constantly pressure-contacting the moving contact 8 to the fixed contacts; and a switching operation lever 17 connected to the moving contact member 9 and extending in the vertical direction thereto. In the switching operation of the main contacts 5, the fixed contacts 10, 10 and the moving contacts 8, 8 are parted by lowering the switching operation lever 17, and as for the drawback movement, the retaining strength of the contact spring 11 permits the fixed contacts 10, 10 and the moving contact 8, 8 to come into contact.”

(See Kamino, col. 4, lines 45-62.) Further, Kamino teaches:

(ii) “Upon cutting off the excitation of the excitation coil 63 of the electromagnet for switching operation 60 in response to an externally applied signal, the moving core 62 moves parted from the fixed core 61 due to the retaining strength of the spring for releasing attraction 64. In response to the above-described movement, the moving core movement pin 73 provided at the moving core 62 causes the electromagnet movement lever 71 to rotate clockwise centered on the axis 72. The cross bar 74 lowers the switching operation lever 17, and the moving contacts 8 and 8 of the moving contact 9 and the fixed contacts 10, 10 are parted accordingly. The circuit is thus disconnected.”

(See Kamino, col. 8, lines 37-49.) Furthermore, Kamino describes that ...

(iii) "when an excessive flow of current beyond the operation current value of the forced contact parting electromagnet upon short circuit condition 30 takes place in the main current path, the forced contact parting electromagnet upon short circuit condition 30 instantly operates to protrude the protruding rod 31 downwardly. The first lever 110 is pivoted clockwise centered on the axis 110 so as to compress the drawback spring 115, in response to the movement of the rod 31. The link member 112 is raised upwardly in response to the pivotal movement of the first lever 110, and the second lever 113 is pivoted anticlockwise centered on the axis 114. The tip end of the second lever 113 lowers the switching operation lever 17. The fixed contacts 10 and the moving contacts 8 are thus parted, thereby opening the contact."

(See Kamino, col. 12, line 55 to col. 13, line 13.) Additionally, Kamino teaches that ...

(iv) "if a large current flow such as a short circuit current takes place, the forced contact parting electromagnet upon short circuit condition 30 is instantly energized and its protruding rod 31 causes the forced contact parting link mechanism upon short circuit condition 18 to operate, to lower the first linking means 17, parting the contacts as a result. [...] Therefore, the forced contact parting electromagnet upon short circuit condition 30 first operates to guide the moving contact member 9 to the open position, and the magnet 30 is de-energized, so that the forced contact parting link mechanism upon short circuit condition maintains the state of movement so as to maintain the contacts to be parted and returns to a waiting state automatically upon movement of the spring releasing mechanism, thereby maintaining the open position of the moving contact member 9".

(See Kamino, col. 12, line 55 to col. 13, line 13.) Kamino neither teaches nor suggests each and every feature of claim 7.

For example, the switch defined in claim 7 uses a holding mechanism including one of a pothook or a baffle. In contrast with claim 7, Kamino's holding mechanism includes the contact spring 11 and the electromagnet for switching operation 60. Thus, the fixed core 61 and the moving core 62 of the electromagnet 60 in Kamino's holding mechanism are attracted to close a circuit and to hold the moving contact 8 and the fixed contacts 10 closed. (See Kamino, FIG. 4.)

Accordingly, Kamino's holding mechanism including a spring and an electromagnet cannot be deemed the "holding mechanism [that] has an electromagnetic iron, and one of a pothook or a baffle" feature of the amended claim 7.

Further, Kamino's forced contact parting electromagnet, including the protruding rod 31, the magnetic yoke 35 and the excitation coil 36, is not used as a holding mechanism for holding the circuit closed, but rather they are used as a mechanism for disconnecting the circuit when a large current flow, such as upon short circuit conditions. (*See Id.*, FIG. 2.) The structural and functional features of Kamino's forced contact parting electromagnet upon short circuit conditions are different from the claimed holding mechanism. Specifically, as described above, the iron core of Kamino's forced contact parting electromagnet is movable upon short circuit conditions to act as a disconnecting mechanism, which is the opposite of the claimed holding mechanism. In contrast to Kamino's disconnecting mechanism, the iron core of the claimed electromagnetic holding mechanism is fixed under short circuit conditions.

Furthermore, the claimed holding mechanism includes a pothook that hitches the movable bolt or a baffle that rams the movable bolt, as recited in claim 7. In contrast to claim 7, Kamino's forced contact parting link mechanism includes the pivot axis 111, the link member 112, and the second lever 113. Kamino's structural features 111-113 are not connected with the switching operation lever 17, therefore Kamino's structural features 111-113 necessarily neither hitch nor ram the switching operation lever 17. (*See Id.*, FIGs. 13.A-B). Therefore, Kamino's forced contact parting link mechanism is distinct from the holding mechanism of claim 1.

Accordingly, for the reasons discussed above, Kamino fails to teach or suggest at least the claimed "a movable iron core connected with the movable bolt to allow the movable bolt to move in dependence on moving of the movable iron core; and an electromagnetic holding mechanism disposed on the bedplate to hold the movable and stationary contacts to connect the circuit after the movable and stationary contacts are connected, wherein the holding mechanism has an electromagnetic iron, and one of a pothook or a baffle, wherein when the electromagnetic drive mechanism is powered on, the movable iron core is attracted so that the movable bolt is driven by the movable iron to move to a position, where the pothook can hitch the movable bolt

or the baffle can ram the movable bolt, and the movable contacts move to contact with the stationary contacts, and then the electromagnetic iron of the holding mechanism is powered on, the pothook or the baffle is attracted by the electromagnetic iron to further keep the movable and stationary contacts closed,” as recited in claim 7.

Accordingly, claim 7 is patentable over Kamino. Claims 14 and 15 depend from claim 7. Therefore, claims 14 and 15 also are patentable at least for the reasons discussed with respect to claim 7.

Additionally, claim 17 defines subject matter similar to claim 7. For example, claim 17 recites “a movable iron core connected with the movable bolt to allow the movable bolt to move based on a movement of the movable iron core; and an elasticity holding mechanism disposed on the bedplate to hold the movable and stationary contacts to connect the circuit after the movable and stationary contacts are connected, wherein said holding mechanism comprises a spring, a stop button, and a reset button in combination, a pothook or a baffle, and wherein said pothook or said baffle abuts against and contacts with the movable bolt by elasticity, wherein when the electromagnetic drive mechanism is powered on, the movable iron core is attracted so that the movable bolt is driven by the movable iron to move to a position, where the pothook can hitch the movable bolt or the baffle can ram the movable bolt, and the movable contacts move to contact with the stationary contacts, and then the pothook is hitched or the baffle is rammed by the elasticity of the spring to further keep the movable and stationary contacts closed, the pothook or the baffle is parted from the movable bolt by pressing the stop button”. Therefore, claim 17 also is patentable over Kamino at least for the reasons discussed with respect to claim 7 and for the additional recitations contained in claim 17.

For example, claim 17 recites “the pothook or the baffle is parted from the movable bolt by pressing the stop button.” The Specification teaches that the starting button can be operated to directly close the electrical switch. The pothook can directly hitch the movable bolt. Alternately, the baffle can directly ram the movable bolt to hold the iron cores 15, 16 of the electrical switch closed. The stop buttons ST and SF can be operated to directly push the pothook or the baffle to disconnect the electrical switch. (*See* Specification, paragraph 140 and FIG. 26.) In contrast to

claim 17, Kamino's forced contact parting electromagnet upon short circuit condition 30 does not include the pothook or the baffle as described in amended claim 17. Therefore, Kamino necessarily cannot disclose "the pothook or the baffle is parted from the movable bolt by pressing the stop button," as recited in claim 17.

Moreover, the electrical switches recited in claims 7 and 17 are patentable over the device in Kamino because the claimed electrical switches comprise various claimed structural features that are configured to operate in a conflicting manner to the device in Kamino. For example, Kamino teaches a circuit breaker that disconnects the electrical switch when short circuit condition occurs. When the electrical switch in Kamino is closed and held closed, it is ideal to configure the cores 61 and 62 to have a larger attraction, and the contract spring 11 should be configured to have a larger elasticity and the spring 64 should be configured to have smaller elasticity to ensure good contact for the movable and stationary contacts. However, when the electrical switch in Kamino is being disconnected, the contact spring 11 should be configured to have smaller elasticity and the spring 64 should be configured to have larger elasticity to ensure that the movable and stationary contacts can disconnect quickly with decreased electrical arc. Thus, closing and disconnecting the electrical switch in Kamino requires the springs 11 and 64 to have conflicting elasticity. In particular, when both springs 11 and 64 have larger elasticity in Kamino, the size of the cores 61 and 62 must be increased accordingly, which increases the cost of the electrical switch. In other words, the electrical switch in Kamino cannot be implemented to include larger elasticity springs without increasing the size of the cores and the overall cost of the electrical switch. This is because Kamino lacks the claimed electromagnetic drive mechanism and the claimed holding mechanism that operate to separately perform opposite functions.

In contrast to Kamino, the claimed electromagnetic drive mechanism and the claimed holding mechanism are operated separately. The claimed electromagnetic drive mechanism is structured to close the circuit only, while the holding mechanism is structured to hold the circuit closed only once the electromagnetic drive mechanism closes the circuit. Therefore, in contrast to Kamino, the claimed electromagnetic drive mechanism and the claimed holding mechanism

can be implemented with springs that have large elasticity while keeping the size of the electrical switch small. Further, the claimed electromagnetic drive mechanism is un-powered once the circuit is closed. Therefore, when the electrical switch is disconnected, the small magnetic remanence enables high speed disconnect with little electric arc. Furthermore, since the claimed electromagnetic drive mechanism can be actuated instantaneously, the claimed electrical switch can be operated when over-loaded. These operation characteristics allow the electrical switch to be very small in size. In contrast to claimed electrical switch, the device in Kamino fails to include the claimed electromagnetic drive mechanism.

### **Rejections Under 35 U.S.C. § 112**

Claims 7 and 17 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for reasons outlined in the Office Action dated 02/04/09, at page 3, paragraph 2. Claims 7 and 17 have been amended to address the antecedence issues indicated by the examiner. Therefore, amended claims 7 and 17 are now patentable.

Claim 14 stands rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for reasons outlined in the Office Action dated 02/04/09, at page 4, paragraph 5. Claim 11 has been amended to address the antecedence issues indicated by the examiner. Therefore, amended claim 14 is now patentable.

Claims 7 and 17 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for reasons outlined in the Office Action dated 02/04/09, at page 3, paragraph 4.

Claim 7 has been amended to clarify the structural cooperative relationship between the pothook and the movable bolt. In the amended claim 7, the structural and cooperative relationship between the pothook or the baffle and the movable bolt is defined as follows:

“wherein when the electromagnetic drive mechanism is powered on, the movable iron core is attracted so that the movable bolt is driven by the movable iron to move to a position where the pothook can hitch the movable bolt or the baffle can ram the movable bolt, and the movable contacts move to contact with the stationary contacts, and then the electromagnetic iron of the holding mechanism is powered on, the pothook or the baffle is attracted by the electromagnetic

iron to further keep the movable and stationary contacts closed.” (*See*, e.g., elements 19-F1 and E1 in FIG. 11; emphasis added.)

Claim 17 has been amended to clarify the structural cooperative relationship between the pothook and the movable bolt. In the amended claim 17, the structural and cooperative relationship between the pothook or the baffle and the movable bolt is defined as follows: “wherein when the electromagnetic drive mechanism is powered on, the movable iron core is attracted so that the movable bolt is driven by the movable iron to move to a position where the pothook can hitch the movable bolt or the baffle can ram the movable bolt, and the movable contacts move to contact with the stationary contacts, and then the pothook is hitched or the baffle is rammed by the elasticity of the spring to further keep the movable and stationary contacts closed, and the pothook or the baffle is parted from the movable bolt by pressing the stop button”. (*See*, e.g., elements 19-F1 and E1 in FIG. 17; emphasis added.)

Accordingly, the amendments to claims 7 and 17 reciting the structural relationship between the pothook and the movable bolt render claims 7 and 17 patentable.



CONCLUSION

The foregoing comments made with respect to the positions taken by the Examiner are not to be construed as acquiescence with other positions of the Examiner that have not been explicitly contested. Accordingly, the above arguments for patentability of a claim should not be construed as implying that there are not other valid reasons for patentability of that claim or other claims.

In view of the amendments and remarks herein, claims 7, 14, 15 and 17 should be in condition for allowance. A formal notice of allowance is respectfully requested.

Please apply any excess claim fees and/or Petition for Extension of Time fee, and any other charges or credits, to deposit account 06-1050.

Respectfully submitted,

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